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IN THE CLAIMS:

Please cancel claims 4-6, 11, 12, 29, 38-77, and 91-101 without prejudice or disclaimer as drawn to a non-elected invention.

Please cancel claims 2, 3, 10, 17, and 19 without prejudice or disclaimer.

Please substitute the claims provided below for the original claims. A marked up version of the amended claims is attached hereto.

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1. (once amended) A substrate processing apparatus comprising:
a process chamber capable of processing a substrate, the
substrate having overlying and underlying materials;
a radiation source capable of providing non-polarized radiation that
is at least partially reflected from the substrate in the chamber;
a radiation detector adapted to detect the reflected radiation and
generate a signal; and
a controller adapted to receive the signal and determine a property
of the overlying or underlying material on substrate in the chamber from a dynamic
variance of amplitude of the signal.

8. (once amended) A method of processing a substrate in a
process zone, the method comprising the steps of:
(a) placing the substrate in the process zone, the substrate
having overlying and underlying materials;
(b) detecting non-polarized radiation reflected from the
substrate before, during, or after processing of the substrate; and
(c) evaluating the detected radiation to determine a property of
the overlying or underlying material on substrate in the process zone from a dynamic
variance of amplitude of the signal.

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9. A method according to claim 8 comprising determining the thickness of the underlying material on the substrate from the dynamic variance of the reflected radiation.

13. (once amended) A substrate processing apparatus comprising:

- (a) a chamber capable of processing a substrate, the substrate having overlying and underlying materials;
- (b) a radiation source capable of providing non-polarized radiation that is at least partially reflected from the substrate in the chamber;
- (c) a radiation detector adapted to detect the reflected radiation and generate a signal; and
- (d) a computer having a memory capable of operating a computer-readable program embodied on a computer-readable medium, the computer readable program including program code to receive the signal and determine a property of the overlying or underlying material on the substrate in the chamber from a dynamic variance of amplitude of the signal.

14. An apparatus according to claim 13 wherein the program code is adapted to determine (i) a thickness of the underlying material or (ii) a dopant level of the overlying material from the dynamic variance of the reflected radiation.

15. (once amended) A substrate processing apparatus comprising:

- (a) a process chamber capable of processing a substrate, the substrate having overlying and underlying materials;
- (b) a radiation source capable of providing radiation that is at least partially reflected from the substrate during processing;
- (c) a radiation detector adapted to detect the reflected radiation and generate a signal; and
- (d) a controller adapted to receive the signal and determine both an onset and a completion of processing of the overlying material on the substrate

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from a predetermined dynamic variance of amplitude of the signal.

16. (once amended) An apparatus according to claim 15 wherein the overlying and underlying materials are processed on the substrate, and wherein the controller is adapted to detect the onset and completion of processing of both materials.

18. (once amended) A method of processing a substrate in a process zone, the method comprising the steps of:

- (a) placing the substrate in the process zone, the substrate having overlying and underlying materials;
- (b) setting process conditions in the process zone to process the substrate;
- (c) detecting radiation reflected from the substrate during processing and generating a signal;
- (d) determining an onset of processing of the overlying material on the substrate; and
- (e) determining a completion of processing of the overlying material from a predetermined dynamic variance of amplitude of the signal.

20. (once amended) A method according to claim 19 wherein the change in amplitude results from changes in reflectivity or thickness of the material.

21. (once amended) A method according to claim 19 wherein the change in amplitude is characterized by a constructive or destructive interference of radiation reflected from the substrate surface and radiation transmitted through a thickness of the overlying material and reflected from one or more underlying interfaces.

22. (once amended) A substrate processing apparatus comprising:
(a) a chamber capable of processing a substrate, the substrate

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having overlying and underlying materials;

(b) a radiation source capable of providing radiation that is at least partially reflected from the substrate during processing;

(c) a radiation detector adapted to detect the reflected radiation and generate a signal; and

(d) a computer having a memory capable of operating computer-readable program embodied on a computer-readable medium, the computer readable program including program code to receive the signal and detect an onset and completion of processing of the overlying material on the substrate from a predetermined dynamic variance of amplitude of the signal.

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78. (once amended) A substrate processing apparatus comprising:
a chamber capable of processing a substrate, the substrate having
overlying and underlying materials;

a radiation source capable of providing radiation that is at least
partially reflected from a substrate in the chamber;

a radiation detector adapted to detect the reflected radiation and
generate a signal; and

a controller adapted to receive the signal and evaluate a dynamic
variance of amplitude of the signal in relation to a calculated or stored range of dynamic
variances of amplitude of the signal for a batch of substrates to determine a property of
the overlying or underlying material of the substrate.

79. (once amended) An apparatus according to claim 78 wherein
the controller is adapted to evaluate the dynamic variance to determine if the dynamic
variance is within the calculated or stored range.

80. (once amended) An apparatus according to claim 78 wherein
the controller is further adapted to provide an instruction signal to remove the substrate
from the chamber, end processing, or adjust process conditions, in response to the
evaluation of the dynamic variance.

81. (once amended) An apparatus according to claim 78 wherein
the controller is adapted to provide an instruction signal at the beginning of processing
of the substrate.

82. (once amended) An apparatus according to claim 78 wherein
the controller is adapted to evaluate a change in the dynamic variance of the amplitude.

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83. (once amended) A method of processing a substrate in a process zone, the method comprising the steps of:

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- (a) placing the substrate in the process zone, the substrate having overlying and underlying materials;
 - (b) detecting radiation reflected from the substrate before, during, or after processing of the substrate and generating a signal; and
 - (c) evaluating a dynamic variance of amplitude of the signal relative to a calculated or stored range of dynamic variances of amplitude of the signal for a batch of substrates to determine a property of the overlying or underlying material of the substrate.

84. (once amended) A method according to claim 83 wherein the step (c) comprises determining if the dynamic variance is within the calculated or stored range.

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86. (once amended) A method according to claim 85 comprising providing the instruction signal to adjust process conditions at the beginning of processing of the substrate.

87. (once amended) A method according to claim 83 comprising evaluating a change in the dynamic variance of the amplitude.

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88. (once amended) A substrate processing apparatus comprising:

(a) a chamber capable of processing a substrate, the substrate having overlying and underlying materials;

(b) a radiation source capable of providing radiation that is at least partially reflected from the substrate during processing;

(c) a radiation detector adapted to detect the reflected radiation and generate a signal; and

(d) a computer having a memory capable of operating a computer-readable program embodied on a computer-readable medium, the computer readable program including program code to receive the signal and evaluate a dynamic variance of amplitude of the signal in relation to a range of dynamic variances of amplitude of the signal for a batch of substrates to determine a property of the overlying or underlying material of the substrate.

89. (once amended) An apparatus according to claim 88 wherein the program code is adapted to evaluate the dynamic variance to determine if the dynamic variance is within the range.

90. (once amended) An apparatus according to claim 88 wherein the program code is further adapted to provide an instruction signal to remove the substrate from the chamber, end processing, or adjust process conditions, in response to the evaluation of the dynamic variance.

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102. (once amended) A substrate processing apparatus comprising:
a chamber capable of processing a substrate, the substrate having
overlying and underlying materials;

a radiation source capable of providing radiation that is at least
partially reflected from the substrate in the chamber;

a radiation detector adapted to detect the reflected radiation and
generate a signal having a dynamic variance of amplitude;

a controller adapted to receive the signal and generate a set of
data from the dynamic variance of amplitude relating to a property of the overlying or
underlying material of the substrate; and

a factory automation host computer to receive and evaluate the
data, and control the processing of the substrate in relation to the data.

104. (once amended) An apparatus according to claim 103 wherein
the software program is adapted to evaluate the data to determine statistical process
control parameters.

106. (once amended) An apparatus according to claim 105 wherein
the factory automation host computer is adapted to provide the instruction signal to
adjust process conditions at the beginning or end of processing of the substrate.

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Please add the following claims.

107. (new) A substrate processing apparatus comprising:
a process chamber capable of processing a substrate, the
substrate having overlying and underlying materials;
a radiation source capable of providing non-polarized radiation that
is at least partially reflected from the substrate in the chamber;
a radiation detector adapted to detect the reflected radiation and
generate a signal; and
a controller adapted to receive the signal and determine a property
of the overlying or underlying material of the substrate in the chamber by determining
whether the signal meets a sequence of preprogrammed slope criteria.

108. (new) A method of processing a substrate in a process zone, the
method comprising the steps of:
(a) placing the substrate in the process zone, the substrate
having overlying and underlying materials;
(b) detecting radiation reflected from the substrate before,
during, or after processing of the substrate; and
(c) evaluating the detected radiation to determine a property of
the overlying or underlying material of the substrate in the process zone by determining
whether the signal meets a sequence of preprogrammed slope criteria.
